

# AMR Virtual Journal Club

The National Institute of Health (NIH) launched the 'AMR Virtual Journal Club' in December 2020, engaging 100 participants in each session. The club aims to strengthen AMR knowledge and is accessible to all pathologists, microbiologists, clinicians and laboratory personnel in Pakistan. The sessions are held every second Wednesday of the month. A group of distinguished presenters

provide an in-depth analysis of one or two research articles pertaining to current trends in microbiology and AMR. Dr Afreenish Amir (Microbiologist) and Miss Saadia Ambreen (Scientific Officer) are leading the club.



### Antimicrobial Resistance (AMR) Containment and Infection Prevention & Control Program

The NIH has launched the "Antimicrobial Resistance (AMR) Containment & Infection Prevention & Control (IPC) Program". A total amount of PKR 361.9 million has been approved under the PSDP project. The provision of local funding for containment of AMR is part of efforts towards the fulfilment of the commitment of the government of Pakistan at the national and provincial level. Pakistan is among the few developing countries that has approved indigenous funding on AMR.



# Awareness Seminar on Tackling AMR through a One Health Approach



Acknowledging the importance of AMR awareness and advocacy, the National Veterinary Laboratories (NVL), with the support of the Fleming Fund Country Grant, organized a one-day, semi-virtual awareness seminar in Islamabad, on March 30, 2021. Over 60 participants attended, with representatives from both the public and private sector, academia and students. Dr Khalid Naeem (One Health Consultant, National Agricultural Research Centre (NARC)), Dr Muhammad Afzal (Project Coordinator, Food and Agriculture Organization) and Dr Hamid Irshad (Principal Scientific Officer, NARC) delivered sessions on different aspects of AMR

The participants were given an overview of the global burden of AMR and its present-day status in Pakistan, the role of laboratories in tackling AMR and the efforts of Fleming Fund Country Grant in combating AMR through the 'One Health' approach.



# **Consultative Meetings in Animal Health**

Two consultative meetings were held on March 09, 2021 and April 27, 2021, for Knowledge, Attitudes and Practices (KAP) Surveys in the Animal Health Sector. Meeting participants included Federal and Provincial Nominees and AMR focal persons, as well as representatives from the National Veterinary Laboratories (NVL), the National Reference Laboratory for Poultry Diseases (NRLPD) and the Animal Husbandry Commissioner Office (AHC). An overview of KAP surveys, their objectives and thematic areas was shared with the participants and feedback was received.





A semi – virtual consultative meeting was arranged on 7th May 2021, at the National Veterinary Laboratory (NVL) to review the draft of the 'Revised National Antimicrobial Resistance Surveillance Strategy in Healthy Food Animals'. The meeting was chaired by Dr Khalid Naeem (Consultant One Health) with 16 participants from the NVL, NRLPD and provincial livestock departments.

A consultative meeting on **Antimicrobial Use Point Prevalence Survey (PPS)** took place on April 13, 2021. **20 people participated** in this event, including team members of the Fleming Fund Country Grant and nominees from the provincial livestock departments.

The following output was obtained from the meeting:

- o Comments on **farming practices**, **animal health care**, **and possible challenges** in AMU PPS were recorded.
- o Stakeholders for AMU PPS in **cattle colonies/periurban dairy** were identified in **each province**.

AMU data from cattle colonies/peri-urban farms should be investigated from the major metropolis of each province.



# Surveillance

### Surveillance and Monitoring of Antimicrobial Resistance Human Health

The PASS surveillance reports show that among priority pathogens *E. Coli* is significantly captured from all bacteriological samples during 2017-2019. Data also reveals that the identification of all pathogens is proportionally increased in 2019 except E.Coli and Salmonella typhi while Streptococcus pneumoniae and *Neisseria gonorrhoeae* identification rate is consistently very low during this period.



#### Year-Wise Proportion of Organisms Among all Samples



Antibiotics

#### The graph shows:

Salmonella typhi is a causative agent for typhoid fever, in Pakistan >8000 cases of typhoid fever were reported in 2020. Due to irrational use of antimicrobials the organism has developed resistance to commonly used antibiotics. During 2017-2019 Salmonella typhi is detected from both stool and blood samples. Antimicrobial resistance pattern for the isolate is same in both stool and blood culture. Data shows that Salmonella typhi is becoming resistant to many antimicrobials and significant resistance is seen mainly for three groups (Ampicillin, fluoroquinolones and sulfonamides) in 2019.



### Point Prevalence Survey (PPS) in Tertiary-care Hospitals of Sindh Province, Pakistan

A cross-sectional PPS based on WHO methodology was conducted to determine antimicrobial utilization pattern from 11 February to 5 March 2021 in six public sector hospitals of Sindh Province, Pakistan by the Fleming Fund Country Grant in collaboration with the provincial health department.



## Key Findings

- **50%** of participating hospitals had a functioning Drug and Therapeutic Committee and a functioning Infection Prevention and Control Committee in the hospital.
- **1/3rd** of hospitals had antibiotic formulary and local antibiotic guidelines to promote rational prescribing practices.
- No hospitals were monitoring the antibiotic use by DDD (Defined Daily Dose) or DOT (Days of Therapy).
- No hospital was participating in the national antibiotic use and surveillance program.
- Overall, the antimicrobial use was greater than **80%** in all the surveyed wards, except Adult ICU ward where the antimicrobial use was reported as **75.0%**.
- Most common trend that is evident from the results of this survey is that in almost all the cases (98.9%) parenteral antimicrobials have been used and there were no guidelines to comply with.



99%

Parenteral

Route of Administration of

 A total of 662 patients were surveyed, the mean age of the patients was 32.9 years with 49.1% males and 50.9% females.

# Analysis from IQVIA Data: 2019 and 2020

The Antimicrobial consumption (AMC) refers to estimates of aggregated data, mainly derived from import and sales data generated from Distribution setups, pharmacies, and medical store. For estimation of antibiotic consumption trends in Pakistan, IQVIA sales data was used for 2019 (pre-COVID) and 2020 (post-COVID).

- Retrospective analysis of IQVIA sales data with the help of Anatomical Therapeutic Chemical/ Defined Daily Doses (ATC/DDD) classification and comparison among different categories of antibiotics and consumption patterns of antibiotics according to the Access, Watch and Reserve (AWaRe) classification was adopted.
- The data was standardized by converting it into defined daily doses (DDDs) sold in the given year according to World Health Organization (WHO) Collaborating Centre for Drug Statistics Methodology which were subsequently used to calculate DIDs (DDDs per 1000 Inhabitants/ day).
- The latest population estimate from the official website of Bureau of Statistics of Pakistan was used to calculate the DIDs.



#### Consumption of antimicrobials according to ATC Sub-Categorization

#### Consumption pattern of AWaRe Antibiotics Per 1000 Individuals per Day



# Clinical Engagement: Improving Healthcare Together

The Clinical Engagement (CE) Program is led by the Indus Network in the Fleming Fund Country Grant II to engage with clinicians and microbiology lab staff in tackling the misuse and overuse of antimicrobials in 6 hospitals. Through this program, health care providers are trained in the development, implementation, monitoring and surveillance of AMR. This in turn will increase the capacity of the clinical sites to oversee and implement AMR and AMU (antimicrobial use) surveillance.



# CLIMATE CHANGE and One Health

The Ministry of Climate Change (MoCC) in Pakistan strikes as the most suitable organization to uptake 'One Health' development in Pakistan. The MoCC recognizes the health sector as one of the most vulnerable to climate change and has proposed several policy measures and projects to limit the threat. In the National Climate Change Policy, the ministry gives adaptation measures for many sectors including health and environment. **The growing population of humans, deforestation and a higher need for animal origin food and agriculture, are threatening the environmental conditions**. This has had a knock-on effect, with opportunities for diseases to pass into animals, which can then be transmitted to humans. This issue can only be tackled through **a collaborative approach, known as 'One Health',** involving experts from various disciplines: human, animal and environmental health, public health, socioeconomic and agriculture. **The Fleming Fund Country Grant is supporting the MoCC** to deliver a report that presents strategic vision of 'One Health' Unit and Organizational structure with defined roles & responsibilities at the MoCC. **A methodology is being developed to conduct the capacity need assessment for MoCC**. An organizational, institutional and coordination structure will be designed in such a way that it bridges the gap for health in non-health sector. Recommendations from consultative meetings will lead to formulation of unit's strategic vision.



# Trainings

### Human Health

#### ISO 17043 and the NEQAS Statistical Model

The Fleming Fund Country Grant Pakistan is supporting the capacity building activities of medical microbiology laboratories to establish them as a national center for AMR diagnosis and surveillance. Under this, the program is supporting the NIH to initiate the National External Quality Assurance Scheme (NEQAS), to provide laboratories across Pakistan with a comprehensive yet cost effective EQA scheme. 26 participants from over 15 labs were virtually trained on NEQAS for Microbiology. The workshop familiarized participants of the Micro NEQAS NIH with documents including participant manual for Micro-NEQAS and the new statistical model, developed with the technical support from Liverpool School of Tropical Medicine (LSTM) in accordance with ISO 17043:2010 (Conformity Assessment- General requirement for Proficiency Testing) standards.

#### Referral Labs Trainings

#### ISO 15189

- Quality and Safety Audit Training 12 NIH personnel were trained in reporting and grading of the laboratory audit findings on 15-16th February 2021 at the NIH, Islamabad.
- Equipment Validation 18 NIH staff were trained on Equipment Validation by AKU on 17-19 February 2021

Biological Risk Assessment

30 technical staff were trained in biological risk assessment on 9th – 11th March 2021, as they prepare to move into the newly furnished BSL-2 laboratory.

AMR Advanced-I Workshop

The NIH, NVL and NRLPD were trained in AMR advance techniques in March 2021, as a follow up, need-based activity on the request of the NIH staff.

Sentinel Labs Trainings

#### Standard Operating Procedure (SOP) Development

More than 30 participants from 10 sentinel sites were trained in SOP development on 20th January 2021, as a follow up session from the Laboratory Quality Management Systems (LQMS) workshop on 9th- 11th December 2020.

#### Mentoring and Support Session for Focal Surveillance Labs

A workshop for basic methods of antimicrobial susceptibility testing was conducted for the labs on 9th – 10th of February 2021, as additional support, by the Fleming Fund Country Grant Pakistan, in collaboration with NIH.



### Animal Health

#### Maintenance and Preservation of Microorganisms and Genomics Extracts

In order to uplift the biorepository standards for the National Reference Labs (National Veterinary Laboratory and National Reference Laboratory for Poultry Diseases) a two days hands on training were organized from 8-9 April 2021 at the University of Haripur on the Maintenance and Preservation of Microorganisms and Genomic Extracts. Six lab personnel from NRLs and four trainers participated in the training workshop.

During the training the participants received an overview of tools and techniques for the preservation of microorganisms for long term storage, different methods used for short term and long-term storage of genomic extracts, Biosafety and Biosecurity Protocols for Biobank, hands-on training in the laboratory on different techniques of preservation methods.





#### Data Collection Tool for Antimicrobial Use Point Prevalence Survey in Dairy Colonies and Peri-Urban Dairy Farms

A virtual training on the Data Collection Tool for quantifying antimicrobial use in peri-urban dairy farms/dairy colonies was conducted on 29 April 2021. The training covered the strategy for the AMU PPS in peri-urban farms and dairy colonies, description on different sections of revised DCT, a mock exercise on revised DCT and monthly DCT submission process.



# Research studies / Articles

## Meta-analysis Report

A meta-analysis was conducted by a team of researchers to find evidence of transmission of Multiple Drug Resistant Organisms between human, animal and the environmental sectors. It covers the analysis of all AMR related publications in the last five years focusing on humans, animals and the environment. Even though both humans and animals have experienced a reduction in their mortality and morbidity, the increased consumption of antibiotics has led to the emergence of resistance microbes that are now threatening the gains that were achieved in the last several decades. In Pakistan, AMR is being recognized as a problem, with evidence showing extensive misuse of antimicrobials at all levels, both in public and private health sectors. Currently, there is not enough data in the country on



antibiotic sale and utilization which is essential to tackle the problem.

### Quantification and Trends of Antimicrobial use in Commercial Broiler Chicken Production in Pakistan

Surveillance of Antimicrobial Use in food animals and its reduction in animal husbandry is one of the key strategic objectives to address the AMR crisis. This requires AMU surveillance in food animals to address critical knowledge gaps and to promote the rational use of antimicrobials and implement antimicrobial stewardship programs in food animals' production.

To bridge this gap, the Fleming Fund Country Grant Pakistan under the leadership of Animal Husbandry Commissioner office, Ministry of National Food Security and Research, Government of Pakistan and support from the provincial Livestock and Dairy Development Department funded the implementation of a point prevalence survey to



quantify farm-level antimicrobial use in broiler production system of Khyber Pakhtunkhwa and Punjab. The findings from the study revealed high AMU in broiler chicken production and a call for urgent actions to regulate Critically Important Antimicrobials (CIA) use in food animals in Pakistan. This baseline survey is critical for the design and implementation of a subsequent national level AMU surveys that can include additional farming types, animals' species, and geographical locations over a longer period.

# Message from AMR Focal Persons

### Provincial (Sindh) - Human Health



"Antimicrobial Resistance (AMR) has emerged as a major health issue resulting in an alarming increase in the burden of infections due to multi-drug resistant organisms while limiting the choice of Antimicrobials for treatment. Provincial health departments have an integral role in implementation of AMR National Action Plan.

Sindh Health Department is committed to play part in global disease control programs most effectively and stand alongside the global community in the effort to reduce AMR burden. Sindh Province is currently struggling to deal with several drug resistant epidemics: Including an outbreak of Extensively Drug Resistant

(XDR) Typhoid which emerged from Hyderabad and gripped in entire Sindh Province and also there is immense burden of Endemic Multi-Drug Resistant (MDR) Tuberculosis, several strains of drug-resistant fungi and other microorganisms.

To prevent growing antimicrobial resistance and ensure rational usage of Antimicrobials among the population, there is a Provincial focal point at Directorate General Health Services Sindh Hyderabad to carry out the different activities includes coordination with all concerned stakeholders, Integration of AMR Surveillance with Integrated Surveillance System at every district level. For further strengthening AMR Surveillance with support of the Fleming Fund, the Directorate General Health Services Sindh is going to establish a Multi-sectorial Coordination Unit to address the AMR and AMS, in such testing times, it is of utmost importance that we need to work closely with all stakeholders to curb the menace of AMR."

Dr Naveed Masood Memon Deputy Director- PDSRU Focal Point AMR - DGHS Sindh

> Dr Muhammad Abu Bakar Senior Scientific Officer

National Focal Person for AMR

**AMR Membership Network NIH** Please click on the link for AMR

Membership form



### Federal - Animal Health

Antimicrobial Resistance is one of the greatest health threats we are facing in the 21st century. It threatens our ability to treat even common infectious diseases, food safety and security and collective well-being, putting Sustainable Development Goals at risk.

Within the animal health sector, we need to be very vigilant in our approach towards AMR. We can prevent emergence of AMR by focusing on disease prevention, herd health management, routine prophylactic vaccination, monitoring of AMR trends in food animals and quantification of farm-level antimicrobial use and awareness and advocacy of AMR to farmers, veterinarians and legislators. and boosting the

immune response of animals.

Another area to focus is the investment in disease management and the use of digital solutions in health monitoring and diagnostics. National Veterinary Laboratory under the Ministry of National Food Security and Research, with the support of the UK aid funded Fleming Fund program is adopting the globally harmonized science-based standards towards AMR commitment. It's time to act more holistically by all the stakeholders under the One Health approach.



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